

# GLOBAL CLIMATE HIGHLIGHTS

## MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF FEBRUARY 15, 1992

### 1. Western North America:

#### MORE MILD WEATHER.

Temperatures averaged 3°C to 6°C above normal in the north-central United States and adjacent Canada; however, somewhat cooler weather prevailed later in the week [10 weeks].

### 2. Northwestern United States and Adjacent Canada:

#### DRYNESS CONTINUES.

Rainfall deficits since the beginning of the year reached 140 mm at some locations as less than 20 mm dampened most of the region [7 weeks].

### 3. California:

#### HEAVY RAINS CAUSE FLOODING, MUDSLIDES.

Torrential rains, exceeding 350 mm in some areas, deluged California as several Pacific storms slammed into the state. Considerable property damage and loss of life, resulting from floods and landslides, were reported by the press. Because of heavy runoff, the abundant rains provided only limited relief from the six year old drought, although more beneficial precipitation moved into the Sierras and southern Cascades over the weekend [2 weeks].

### 4. Mexico and the Southern United States:

#### LIMITED RELIEF FROM RAINS.

Spotty rainfall of 50 mm to 175 mm doused the lower Mississippi Valley, deep South, and central Texas Gulf Coast, causing more flooding as precipitation surpluses since early January approached 400 mm [18 weeks]. However, drier conditions provided some relief in central Texas and Mexico, and temperatures in Mexico returned to near normal [Ended at 3 weeks].

### 5. East-Central South America:

#### RELIEF FOR ARGENTINA, DRY ELSEWHERE.

Abundant rains of 50 mm to 150 mm provided relief for northern Argentina; however, six-week rainfall deficits across eastern Paraguay and adjacent Brazil remained near 300 mm in spots [7 weeks].

### 6. Western Europe:

#### WELCOME RAINS PROVIDE SOME RELIEF.

Moderate precipitation totals of 20 mm to 50 mm provided welcome relief across much of northern and western Europe, but parts of extreme western Europe and the United Kingdom have still recorded deficits of 100 mm to 150 mm since the beginning of the year [7 weeks].

### 7. Middle East and Northeastern Africa:

#### LOW TEMPERATURES PERSIST.

Temperatures averaged as much as 10°C below normal in Turkey and 8°C below normal in the Middle East and northeastern Africa as the severe winter of 1991-92 maintained a tight grip on the region [12 weeks].

### 8. Southern Africa:

#### WARM, DRY WEATHER PREVAILS.

Temperatures averaging up to 4°C above normal last week aggravated unusually dry conditions across the region [3 weeks]. Since early January, moisture deficits of up to 140 mm have been recorded, and press reports indicate that severe crop shortages may result. [10 weeks].

### 9. Western Pacific:

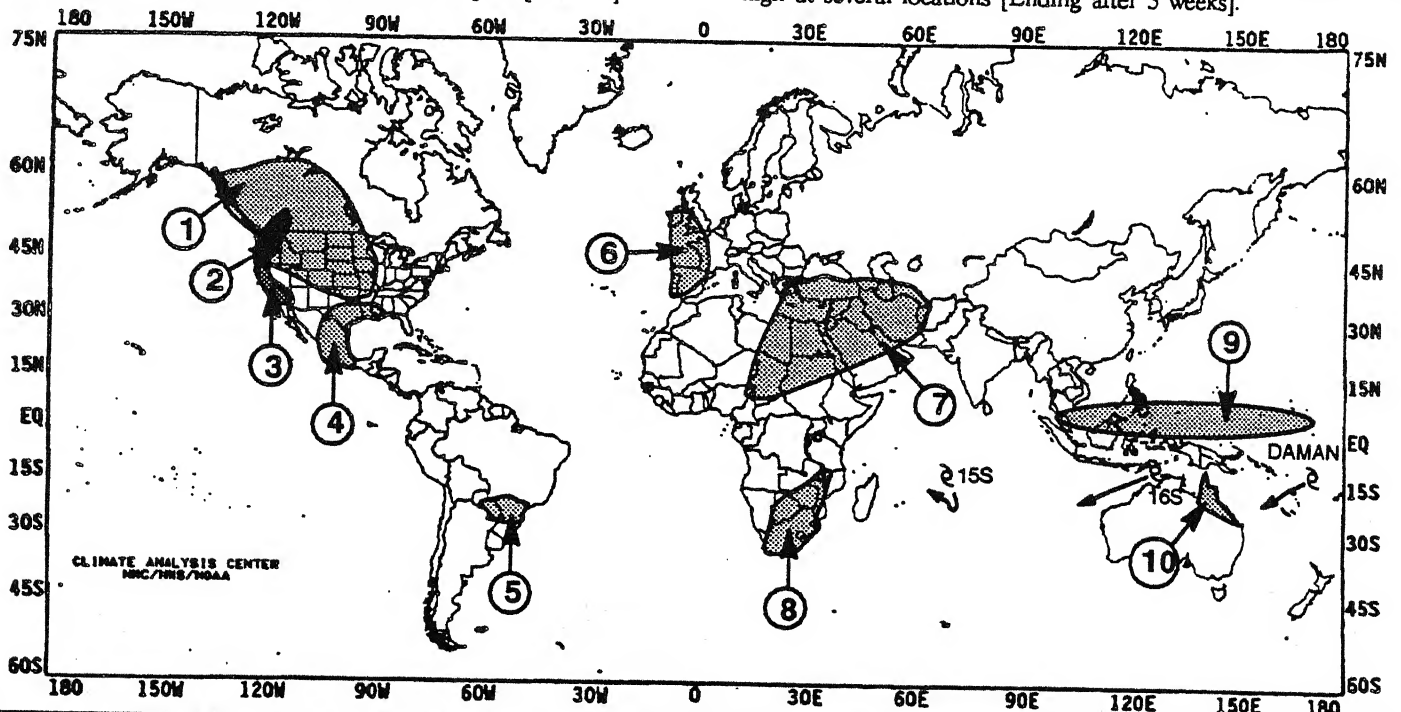
#### MORE DRY WEATHER.

Abnormally dry conditions persisted in northern Borneo, the Philippines, and the Caroline Islands as six-week moisture deficits climbed as high as 180 mm. The extreme eastern Philippines received up to 30 mm of rain last week, but less than 10 mm was reported elsewhere [7 weeks].

### 10. Northeastern Australia:

#### RELIEF CONTINUES.

Rainfall amounts of up to 50 mm again provided short-term relief for much of the area, but six-week precipitation deficits remained high at several locations [Ending after 5 weeks].



#### EXPLANATION

**TEXT:** Approximate duration of anomalies is in brackets. Precipitation amounts and temperature departures are this week's values.  
**MAP:** Approximate locations of major anomalies and episodic events are shown. See other maps in this Bulletin for current two week temperature anomalies, four week precipitation anomalies, long-term anomalies, and other details.

# UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

## FOR THE WEEK OF FEBRUARY 9-15, 1992

A series of strong Pacific storms pounded California, dumping up to 15 inches of rain in southern California and nearly 7 feet of snow in the mountains. These torrential rains generated some of the worst flooding in 50 years across parts of southern California. As many as 150 homes were damaged and/or destroyed by floods and mud slides in 4 counties, according to press reports. Property damage was placed at \$23 million, and Governor Wilson declared Ventura and Los Angeles counties disaster areas. Raging floodwaters and mud slides forced the closure of numerous roads and made evacuations necessary in some locations. The rapid run-off contributed to a 66 million gallon spill of sewage into the Pacific Ocean, closing approximately 100 miles of beach in San Diego, Orange, and Los Angeles counties due to elevated levels of bacteria. In addition, beaches were strewn with debris from floodwaters that swept into the ocean. Ironically, the heavy rains provided only limited relief from the long-term drought since the majority of the rain and snow fell south of the state's major reservoirs or was swept into the Pacific Ocean as runoff. On Friday and Saturday, however, another strong storm system generated over 3 feet of beneficial snow in the southern Sierra Nevadas. Elsewhere, spring-like thunderstorms rocked eastern Texas and the Deep South, dropping heavy rain and hail and spawning a few tornadoes. Flooding was reported on several rivers in Texas after 7 inches of rain inundated some locations. Farther north, wintry weather clung to the Great Lakes and New England where more than half a foot of snow was measured on Saturday. Frigid air produced sub-zero lows from Michigan to Maine. On Monday morning, both Chaffee and Sherman, NY recorded lows of -20°F, the lowest readings in over 3 years.

The week began with a strong storm system and trailing cold front off the West Coast. Rain spread across California as the front moved ashore. The system dissipated as it continued eastward, but was followed by a second front on Monday which generated inundating rains in southern California. Over 6 inches soaked Woodland Hills, CA on Sunday and Monday while nearly a foot of snow blanketed the southern mountains. Flooding was reported in Ventura and Los Angeles counties, and rock and mud slides occurred in the surrounding hillsides. Dozens of stranded motorists were rescued by helicopter as fast-rising floodwaters inundated roads. Thunderstorms produced lightning strikes that knocked-out power to 80,000 customers in the San Fernando Valley. Elsewhere, heavy rain soaked southeastern Texas, flooding streets in Victoria, while to the north snow blanketed portions of the northern and central Plains. Wintry conditions also gripped much of the upper Midwest, Great Lakes, and Northeast. Snow squalls blanketed the "snow-belt" areas Sunday as bitterly cold air and strong wind gusts produced dangerous wind chills in New England.

During the latter half of the week, more heavy precipitation pelted California. Another cold front moved on-shore Wednesday, producing heavy rain and generating additional flooding and mud and rock slides in southern California. A brief reprieve from the heavy rain occurred in southern California on Thursday as sunny conditions prevailed. However, the next in the series of storms rapidly moved into the state Friday. This system moved further to the north, sparing

southern California from the heaviest precipitation. The associated frontal system generated heavy rain in northern and central California and heavy snow in the Sierra Nevadas. Blue Canyon, CA received 37 inches of snow in 24 hours, and amounts exceeding a foot were common in the the southern portions of the Sierra Nevadas. Farther south, severe thunderstorms erupted along and ahead of the front as it moved through southern California. Wind gusts to 92 mph were reported at Vandenberg, and a tornado touched down at Camp Pendleton. Elsewhere, flooding continued along the Guadalupe, Lavaca, and Navidad rivers in Texas, inundating several homes in Liberty County. Farther east, severe weather rocked parts of the Mississippi Valley and Deep South ahead of a fast-moving storm system. More than 2 inches of rain drenched portions of Mississippi and Louisiana while tornadoes touched down in Louisiana and Missouri. To the south, unseasonably warm conditions enveloped southern Texas, producing record daily highs at Port Arthur and Galveston on Saturday when readings topped 80°F. In sharp contrast, wintry weather prevailed in the Northeast and mid-Atlantic and Ohio Valley. Mixed precipitation fell on much of the Ohio Valley and mid-Atlantic while heavy snow blanketed northern New England.

According to the River Forecast Centers, the greatest weekly precipitation totals (more than 2 inches) fell on most of California, the Southwest, the central Rockies, eastern sections of the southern Plains, the lower half of the Mississippi Valley, most of the Deep South, the southern and central Appalachians, and scattered locations in the lower Ohio Valley, Pacific Northwest, and western Hawaii (Table 1). Light to moderate totals were measured in New England, the middle and most of the southern Atlantic, southeastern and northwestern Florida, the Great Lakes, the remainders of the Ohio and Mississippi Valleys, the central Plains, the Intermountain West, the Pacific Northwest, most of Alaska, and the remainder of Hawaii. Little or no precipitation was reported in the remainder of Florida, the western and northern Plains, northern and southern Rockies, and south-central Alaska.

Unusually mild conditions dominated much of the contiguous U.S. for a third consecutive week (Table 2). Weekly departures between +8°F and +14°F were prevalent across the southern Plains, where highs soared into the eighties, and in the northern High Plains and northern Rockies. Departures of +3°F to +7°F were common from the Ohio Valley and Deep South westward to the Pacific Coast, including much of the northern and central Plains where mild weather has prevailed for most of the Winter (Figure 1). Near to slightly above normal temperatures covered Florida, the south Atlantic, and portions of southern California. Warmer than normal conditions also dominated the northwestern two-thirds of Alaska, with weekly departures to +17°F observed at Bethel.

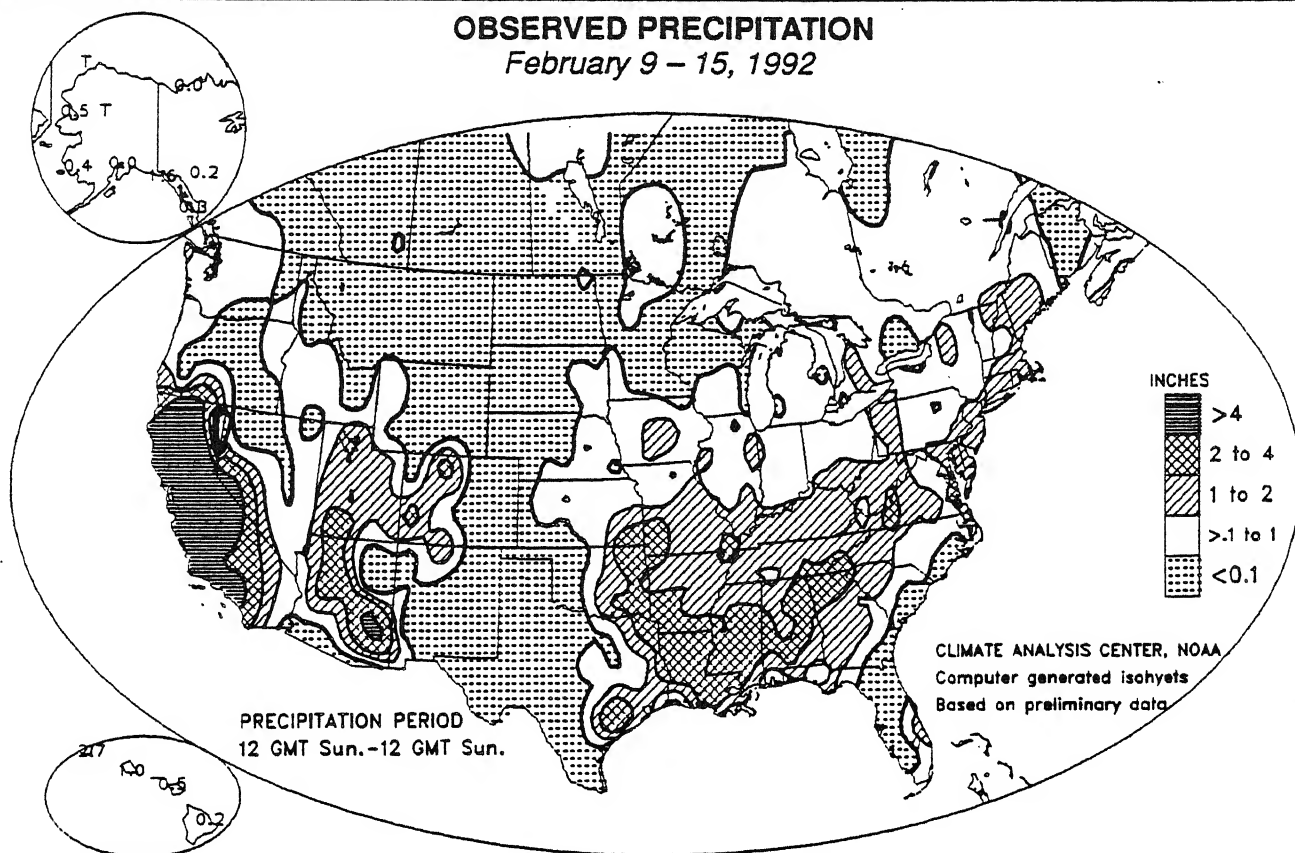
Cooler than normal conditions were restricted to New England and the mid-Atlantic (Table 3). Weekly departures between -3°F and -7°F were common from New Jersey to Maine, and slightly lesser departures dominated the remaining areas. In Alaska, unseasonably cold weather was confined to south-central parts of the state with weekly departures to -8°F recorded at Kenai.

**TABLE 1. SELECTED STATIONS WITH 2.75 OR MORE INCHES OF PRECIPITATION DURING THE WEEK OF FEBRUARY 9 - 15, 1992**

STATION	TOTAL (INCHES)	STATION	TOTAL (INCHES)
TORO NDB, CA	6.50	SAN BERNARDINO/NORTON AFB, CA	3.89
LELLAN AFB, CA	5.39	SALINAS, CA	3.57
	5.26	MCCOMB, MS	3.48
	5.00	SACRAMENTO, CA	3.42
	4.82	REEVES/LEMOORE NAS, CA	3.41
	4.78	FAIRFIELD/TRAVIS AFB, CA	3.38
CA	4.71	VERO BEACH, FL	3.34
	4.69	LOS ANGELES, CA	3.33
THE SHASTA MOUNTAIN, CA	4.52	EL DORADO, AR	3.11
MARYSVILLE/BEALE AFB, CA	4.46	BATON ROUGE, LA	3.04
FRESNO, CA	4.16	TUSTIN MCAS, CA	2.96
RIVERSIDE/MARCH AFB, CA	4.14	LONG BEACH, CA	2.94
SANTA BARBARA, CA	3.89	MT SHASTA, CA	2.83

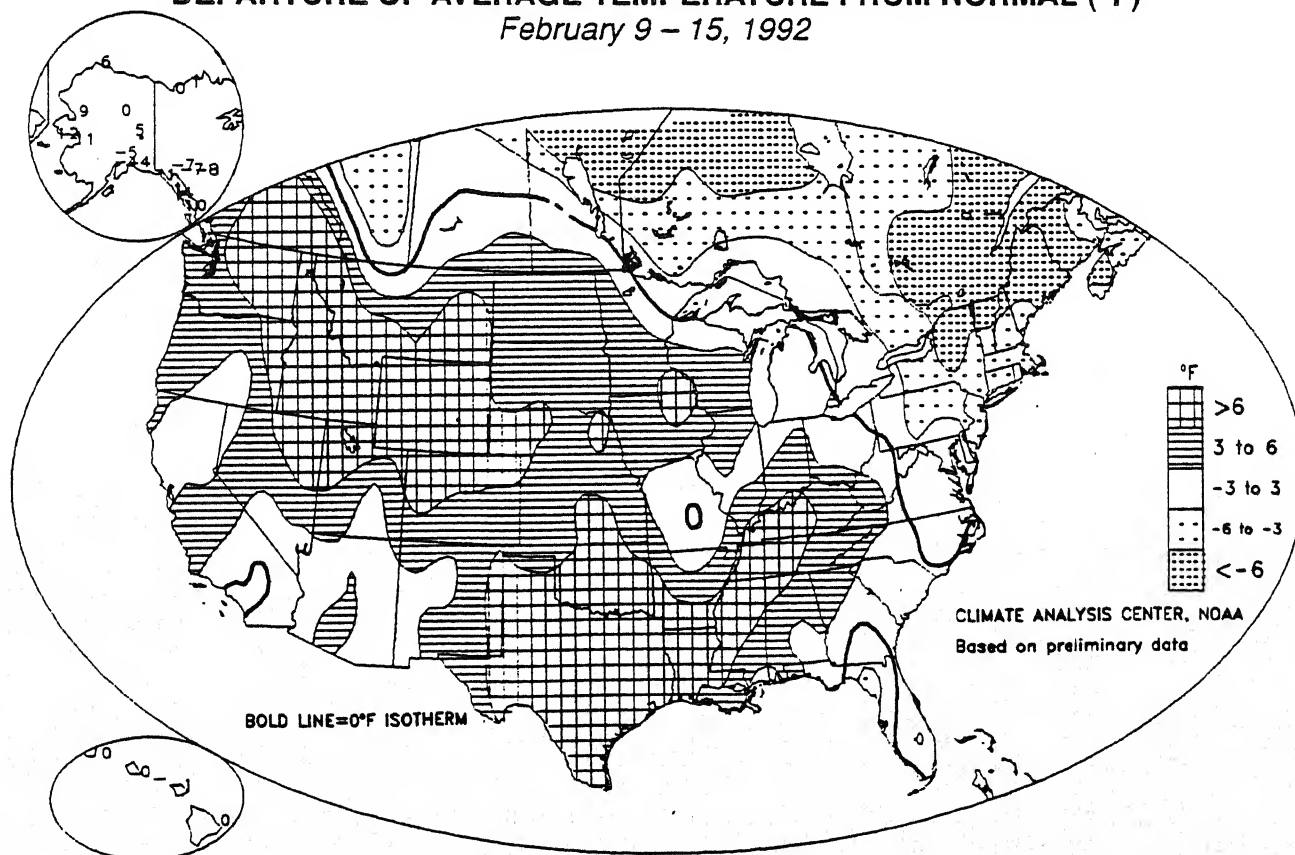
# **OBSERVED PRECIPITATION**

February 9 - 15, 1992



# **DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F)**

February 9 - 15, 1992

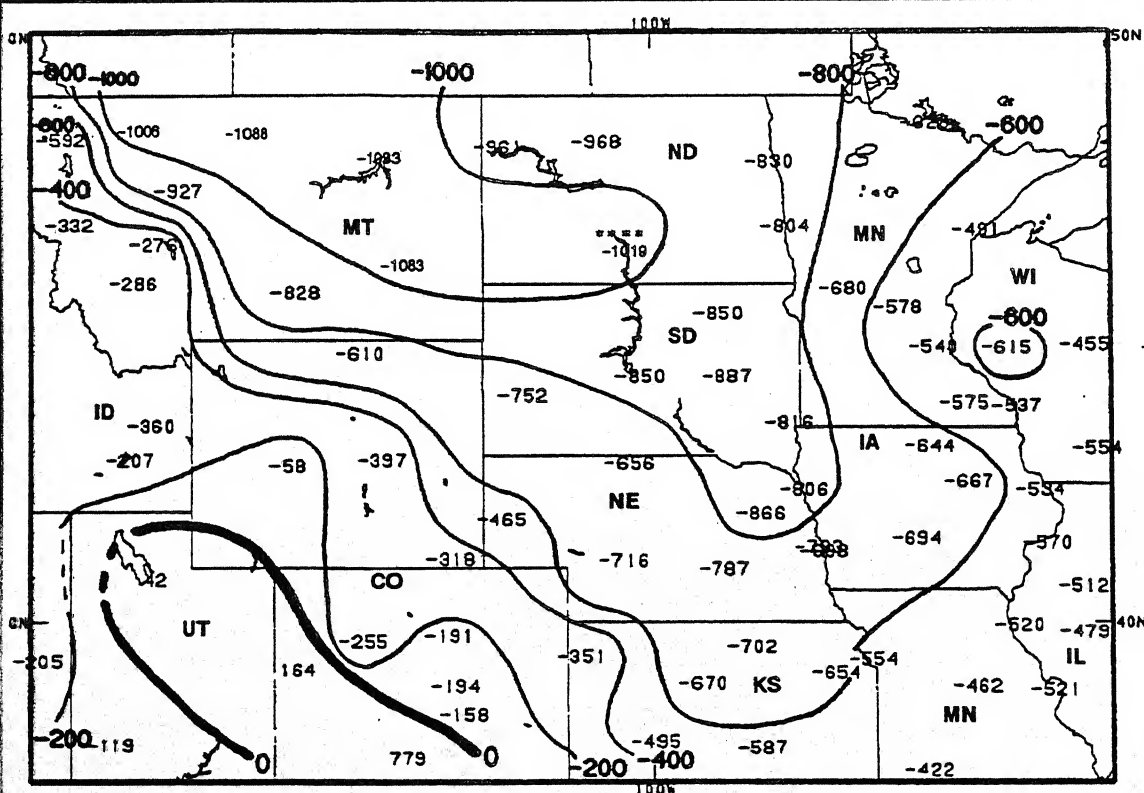


**TABLE 2. SELECTED STATIONS WITH TEMPERATURES AVERAGING 9.0°F OR MORE ABOVE NORMAL FOR THE WEEK OF FEBRUARY 9 - 15, 1992**

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
BETHEL, AK	+17.2	22.9	ST PAUL ISLAND, AK	+10.5	32.7
MCGRATH, AK	+15.8	12.9	CASPER, WY	+10.4	37.2
ANIAK, AK	+15.1	20.8	CORPUS CHRISTI, TX	+10.2	68.0
IDAHO FALLS, ID	+13.5	37.2	MILES CITY, MT	+10.2	31.4
NOME, AK	+12.0	15.5	KOTZEBUE, AK	+10.0	5.2
SAN ANTONIO, TX	+11.9	65.5	COLLEGE STATION, TX	+9.9	62.3
BEEVILLE NAS, TX	+11.6	68.9	AUSTIN/BERGSTROM AFB, TX	+9.8	63.7
VICTORIA, TX	+11.6	66.6	SPOKANE, WA	+9.5	41.4
BOZEMAN, MT	+11.5	32.9	BURLEY, ID	+9.4	41.5
POCATELLO, ID	+11.4	40.5	LUBBOCK, TX	+9.3	51.2
EAGLE, CO	+11.4	34.7	SAN ANGELO, TX	+9.2	58.4
DELTA, UT	+11.2	41.9	ALICE, TX	+9.1	67.1
AUSTIN, TX	+11.0	63.4	BAKER, OR	+9.1	40.2
WORLAND, WY	+10.6	31.1			

**TABLE 3. SELECTED STATIONS WITH TEMPERATURES AVERAGING 4.5°F OR MORE BELOW NORMAL FOR THE WEEK OF FEBRUARY 9 - 15, 1992**

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
ROME/GRIFFISS AFB, NY	-8.9	15.1	GLENS FALLS, NY	-5.5	14.1
KENAI, AK	-7.6	8.2	TALKEETNA, AK	-5.4	8.9
HOULTON, ME	-7.1	6.5	MASSENA, NY	-5.3	10.6
UTICA, NY	-7.0	13.9	SYRACUSE, NY	-5.2	18.4
BANGOR, ME	-6.9	11.9	AUGUSTA, ME	-5.1	15.6
EASTPORT, ME	-6.8	16.6	WRIGHTSTOWN/MCGUIRE AFB, NJ	-4.9	28.8
MONTPELIER, VT	-6.2	10.4	ALTOONA, PA	-4.6	24.7
CARIBOU, ME	-5.8	6.3	ATLANTIC CITY, NJ	-4.6	28.4
BURLINGTON, VT	-5.7	11.6	ANCHORAGE, AK	-4.5	13.0
ALAMOSA, CO	-5.6	16.3	WORCESTER, MA	-4.5	19.6



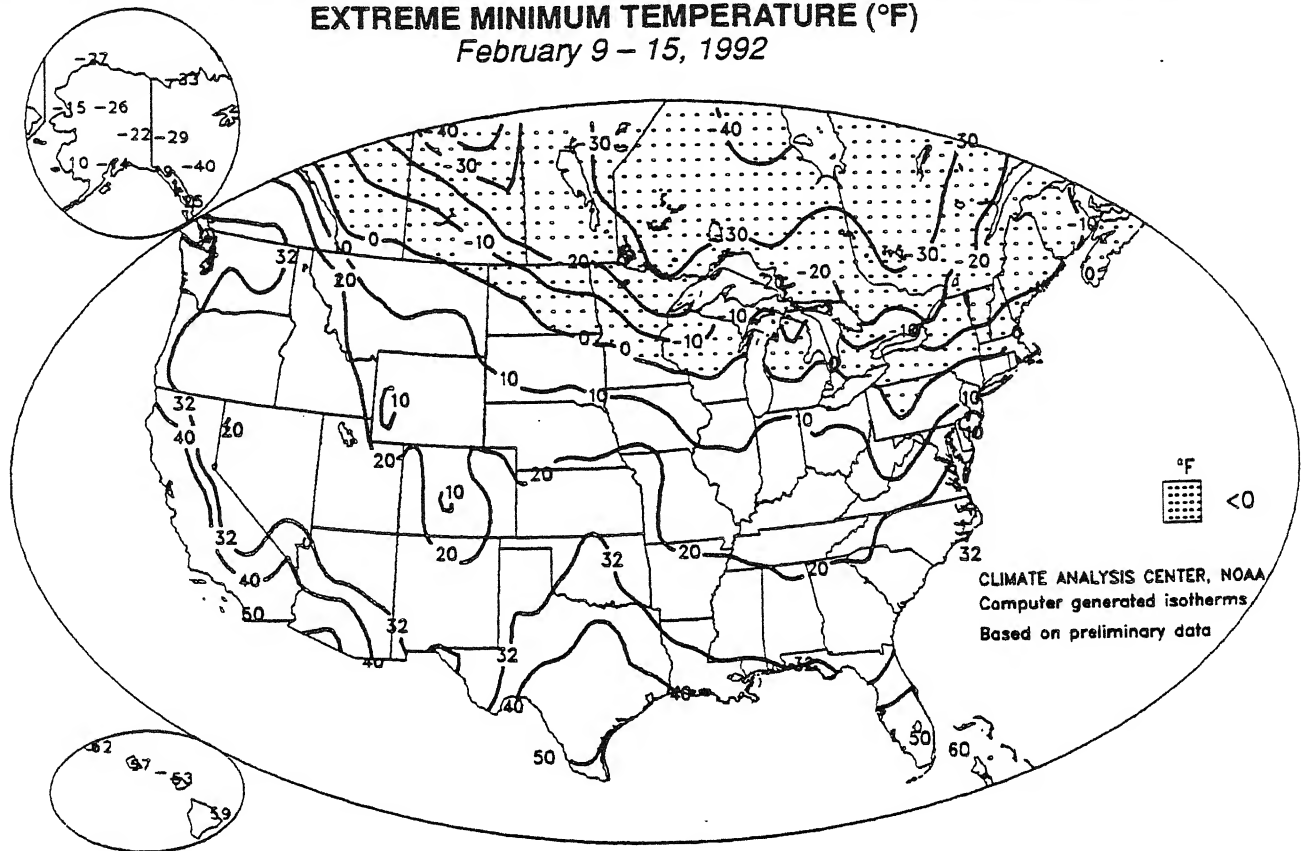
**FIGURE 1.** Departure from Normal Heating Degree Days across the northern and central Plains during December 1, 1991 - February 15, 1992. Abnormally mild weather has encompassed the region during the first 80% of the meteorological Winter, generating a significantly lower than normal heating demand. Northern portions of the High Plains and Great Plains, where some locations have recorded over 1000 fewer HDD's than normal, have accumulated only 70% to 80% of the

normal seasonal HDD total through mid-February. The unusually warm Winter corresponds well with the typical low-index (warm) ENSO temperature relection in the region, which is anomalously high temperatures across southwestern Canada and the northwestern and north-central United States through March.



# EXTREME MINIMUM TEMPERATURE (°F)

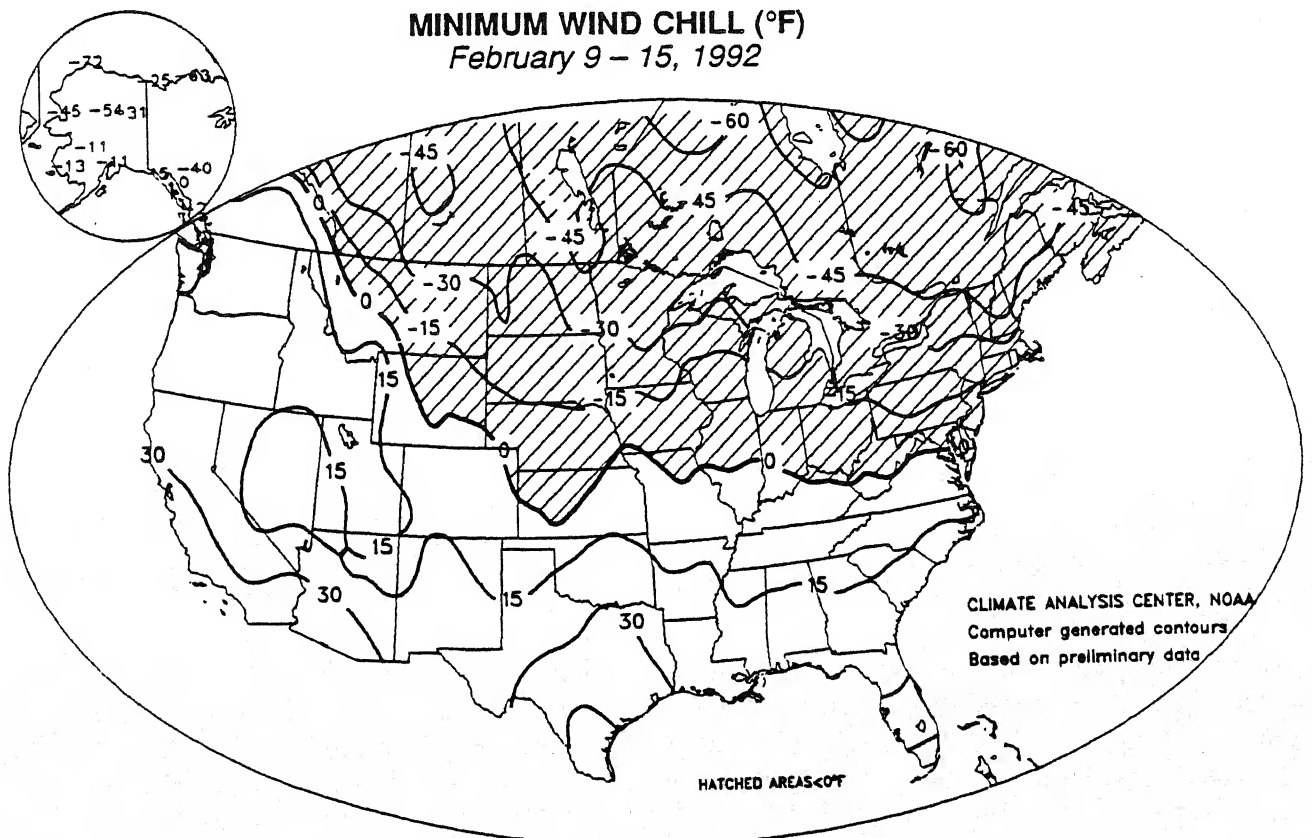
February 9 - 15, 1992



Cold Canadian air moved into the contiguous 48 states, dropping temperatures into the teens as far south as the central Rockies, the Tennessee Valley, and the southern Appalachians (top). Strong winds accompanied the cold air across northern New England, sending wind chills below -45°F (bottom).

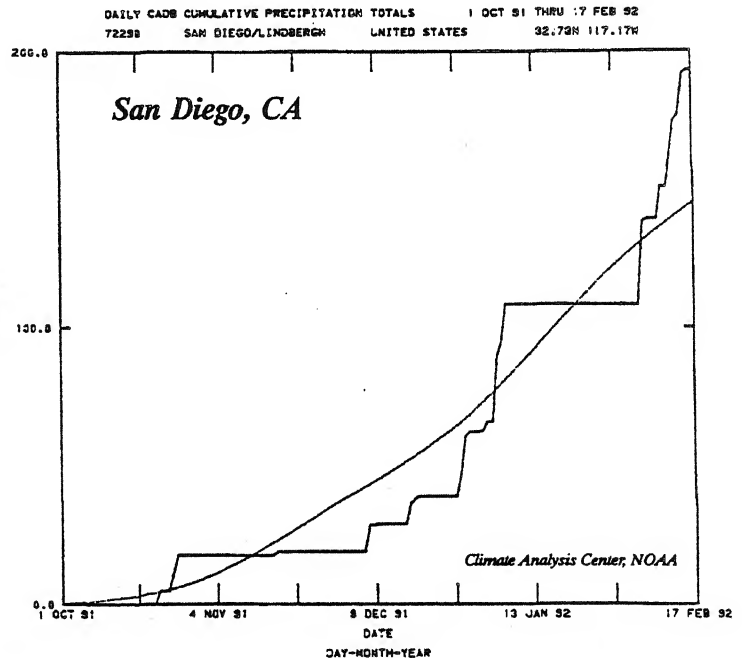
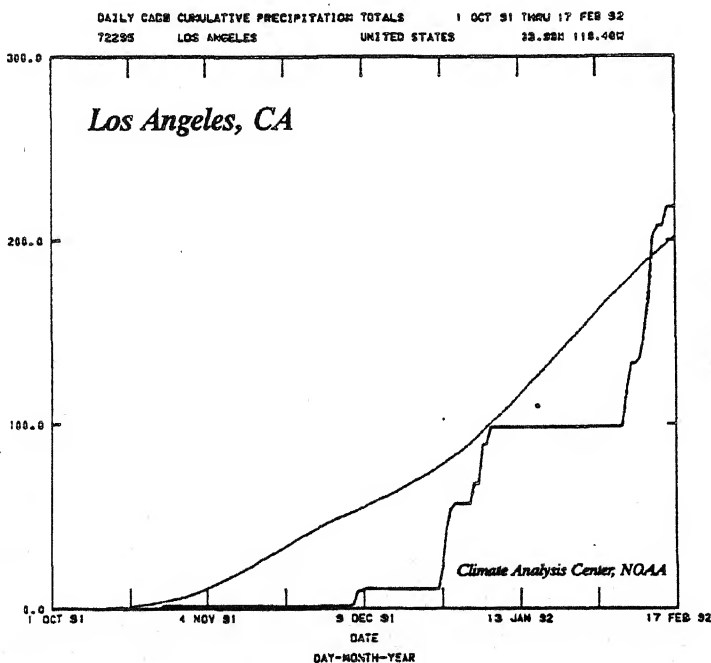
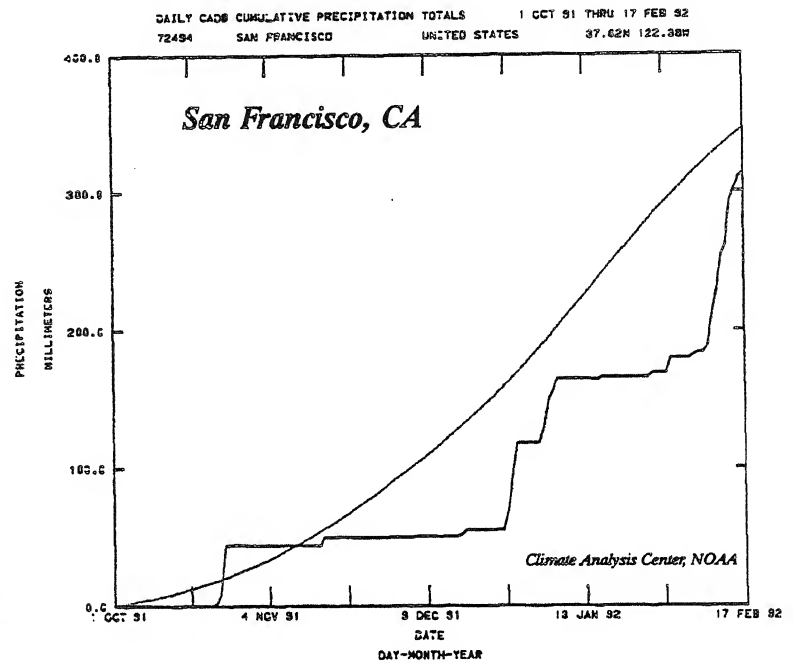
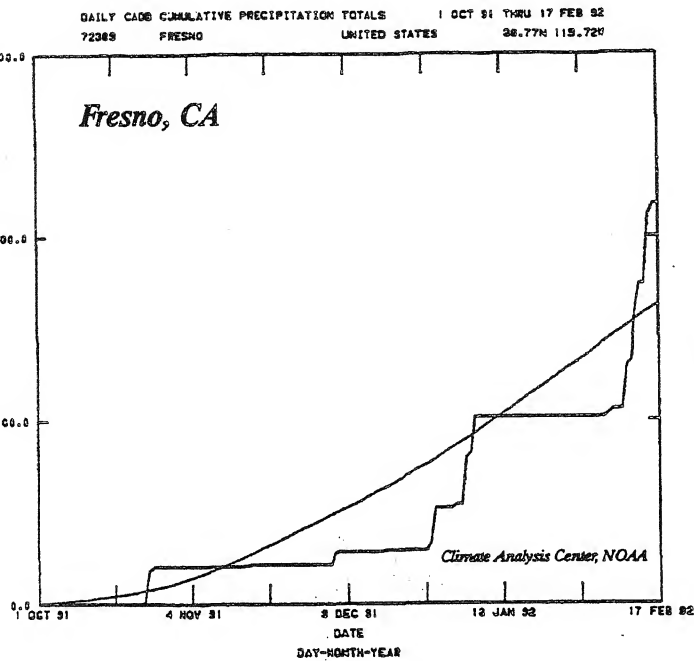
# MINIMUM WIND CHILL (°F)

February 9 - 15, 1992



# GLOBAL CLIMATE HIGHLIGHTS FEATURE

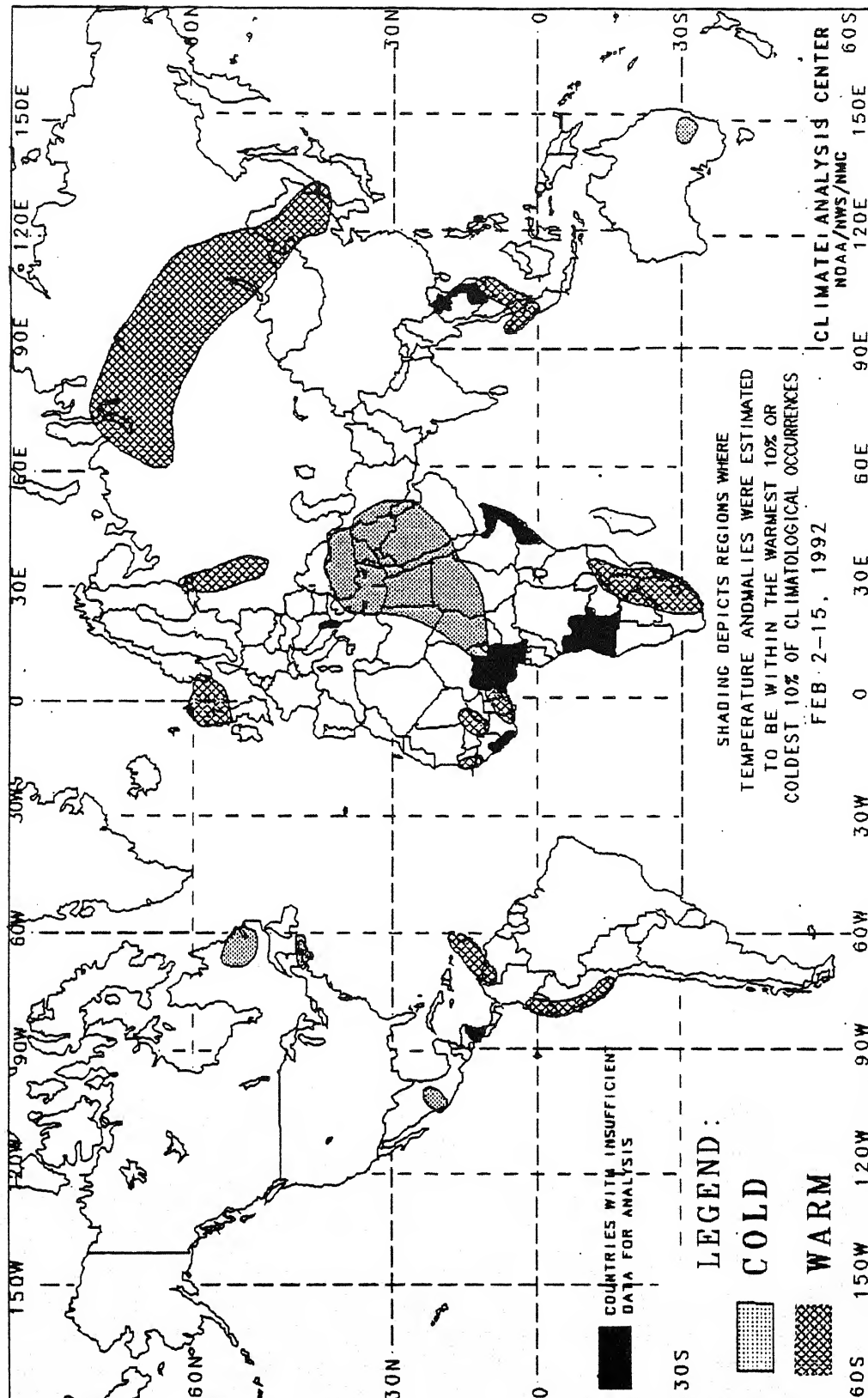
Cumulative Normal (dashed, smooth line) vs. Actual (solid, jagged line) Precipitation  
October 1, 1991 – February 16, 1992



The recent storms across California brought wet season precipitation totals through February 16, 1992 to near or slightly above normal at most locations. However, these graphs overstate the amount of useful water that was stored as mountain snowpack or in northern California's reservoirs, since much of the precipitation fell on the southern part of the state, which is of less hydrological importance, or was swept into the ocean as runoff.

# 2-WEEK GLOBAL TEMPERATURE ANOMALIES

FEBRUARY 2 - 15, 1991



The anomalies on this chart are based on approximately 2500 observing stations for which at least 13 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

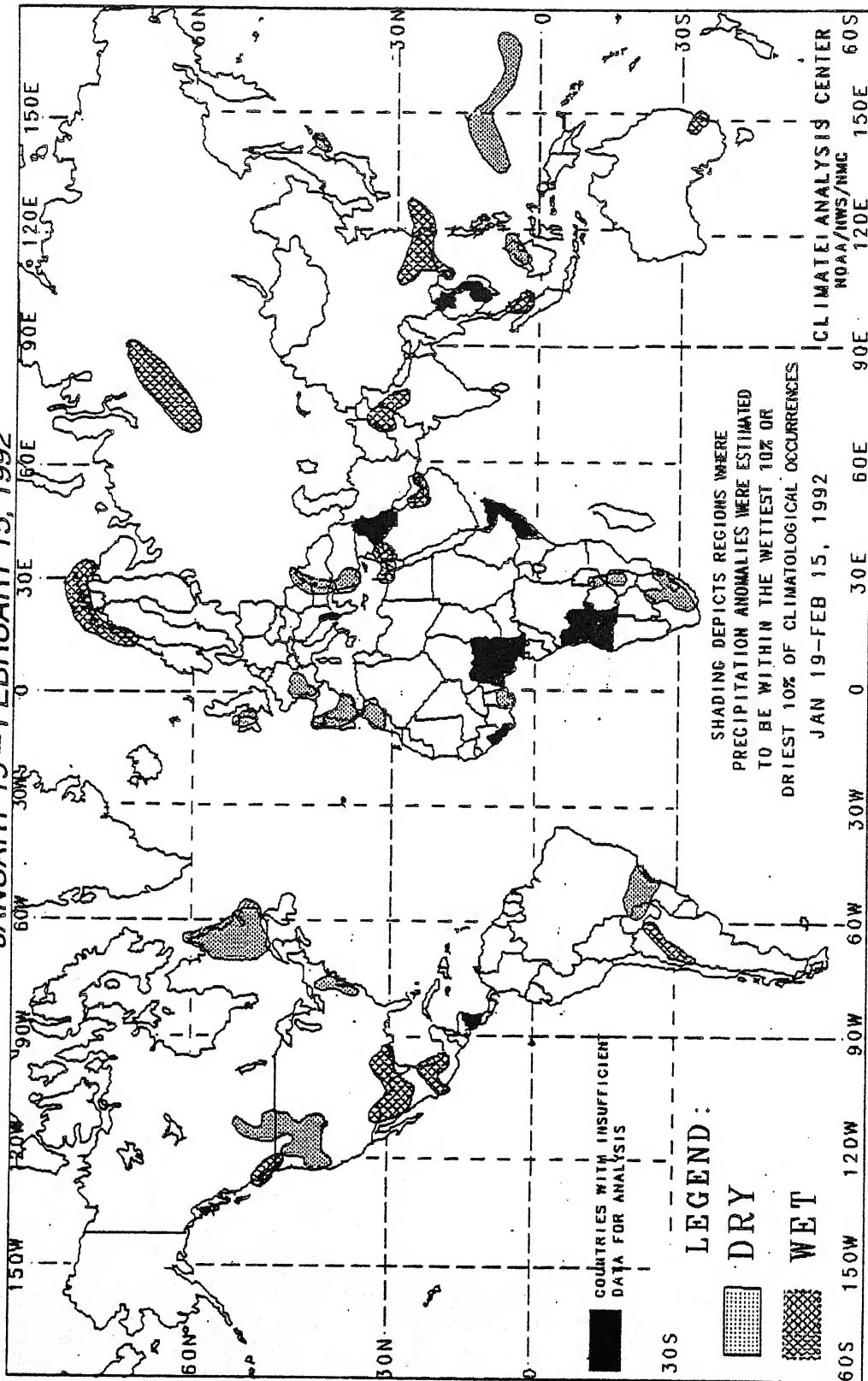
Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

This chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

# 4-WEEK GLOBAL PRECIPITATION ANOMALIES

JANUARY 19 - FEBRUARY 15, 1992



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

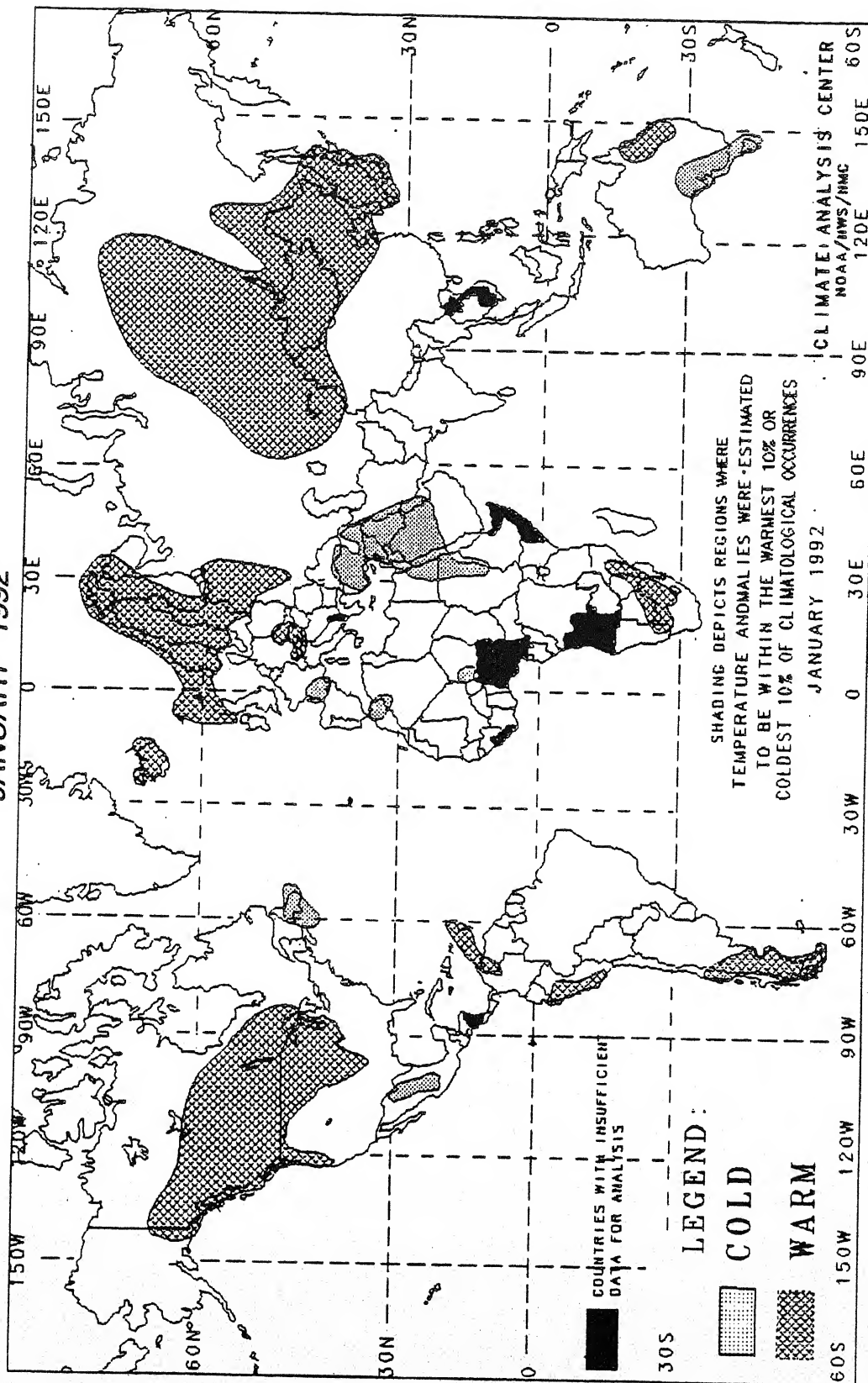
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The chart shows general areas of four week precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.



# MONTHLY GLOBAL TEMPERATURE ANOMALIES

JANUARY 1992



The anomalies on this chart are based on approximately 2500 observing stations for which at least 26 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

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This chart shows general areas of one month temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

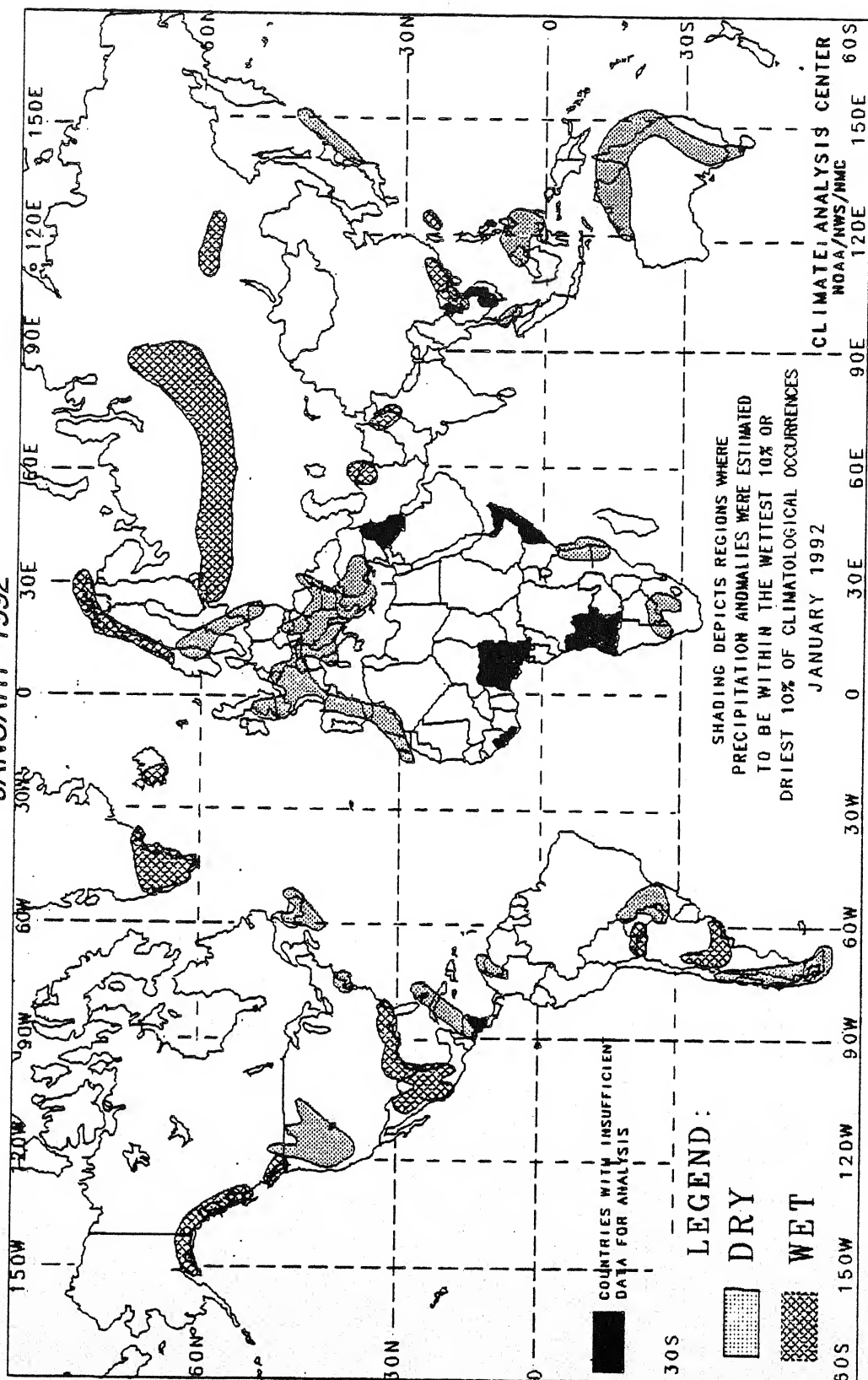
# PRINCIPAL TEMPERATURE ANOMALIES

JANUARY 1992

REGIONS AFFECTED	TEMPERATURE AVERAGE (°C)	DEPARTURE FROM NORMAL (°C)	COMMENTS
<b>NORTH AMERICA</b>			
North America	-22 to +7	+2 to +12	MILD - 10 to 14 weeks
Canadian Maritime Provinces	-7 to -2	-2 to -3	Very cold second half of January
Mexico	+7 to +14	-2 to -3	Very cold second half of January
<b>SOUTH AMERICA AND EASTERN PACIFIC</b>			
Western Venezuela and the Caribbean	+20 to +28	+2 to +3	WARM - 5 weeks
Western Peru	+23 to +29	+2 to +3	WARM - 6 weeks
Southern South America	+12 to +21	+2 to +3	WARM - 2 to 6 weeks
<b>EUROPE AND THE MIDDLE EAST</b>			
Iceland	+2 to +3	+3 to +5	MILD - 2 to 4 weeks
Northern Europe	-9 to +7	+2 to +7	MILD - 2 to 8 weeks
Central Europe	-9 to +3	+3 to +4	MILD - 5 to 7 weeks
Southwestern France	+3 to +6	Around -2	Very cold second half of January
Turkey and the Middle East	-17 to +14	-2 to -9	COLD - 4 to 18 weeks
<b>AFRICA</b>			
Morocco and Adjacent Algeria	+7 to +9	Around -3	COOL - 6 weeks
Eastern Egypt and Northeastern Sudan	+14 to +21	-2 to -3	Very cool first half of January
Western Niger	+21 to +22	Around -2	Very cool first half of January
Southern Africa	+21 to +30	+2 to +3	WARM - 2 to 6 weeks
<b>ASIA</b>			
Eastern Asia	-34 to +10	+2 to +12	MILD - 4 to 22 weeks
<b>AUSTRALIA AND WESTERN PACIFIC</b>			
Northeastern Australia	+28 to +32	Around +2	WARM - 2 to 7 weeks
Southeastern Australia	+13 to +27	-2 to -3	COOL - 2 to 10 weeks

# MONTHLY GLOBAL PRECIPITATION ANOMALIES

JANUARY 1992



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the one month period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total one month precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of one month precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

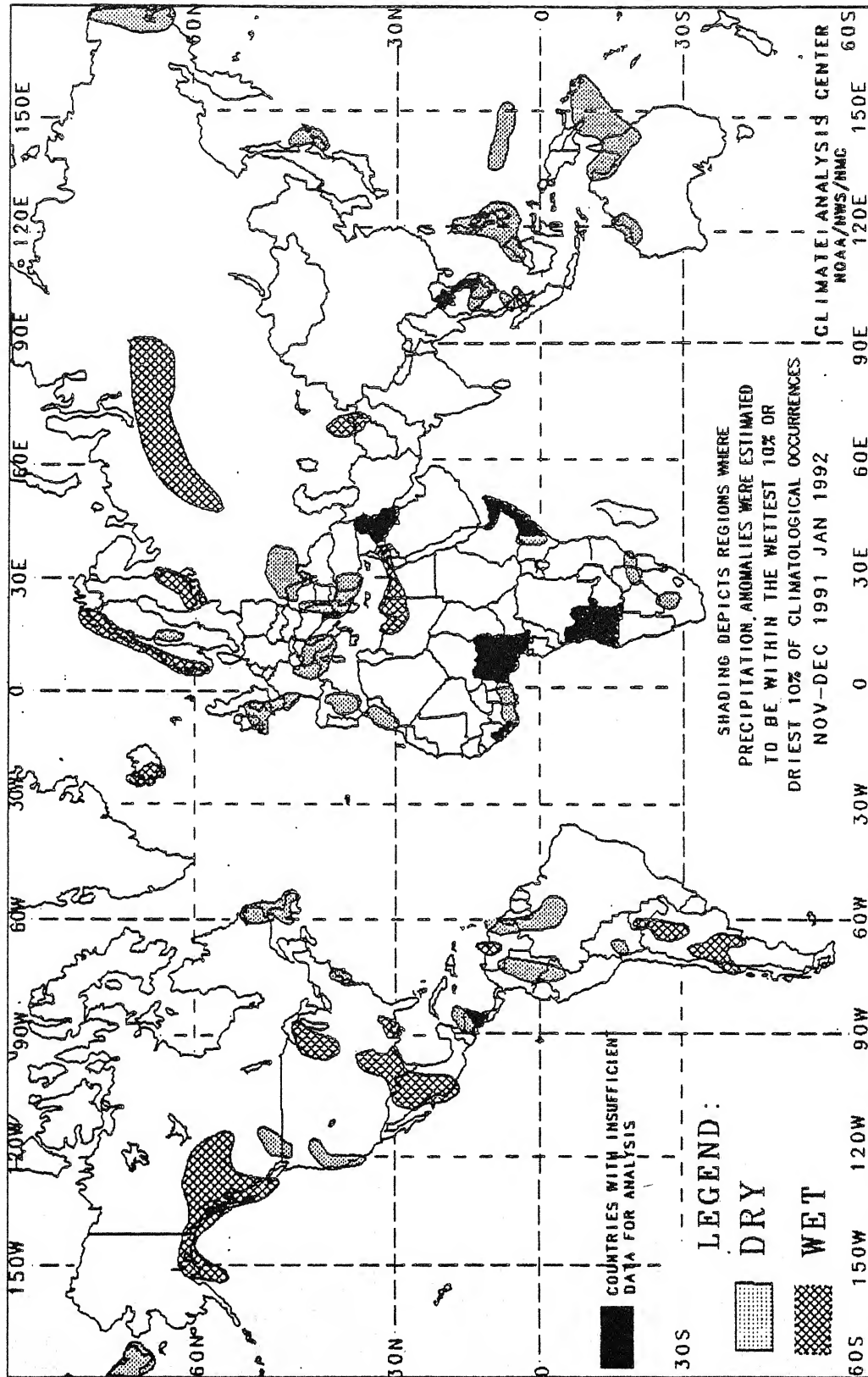
# PRINCIPAL PRECIPITATION ANOMALIES

JANUARY 1992

REGIONS AFFECTED	PRECIPITATION TOTAL (MM)	PERCENT OF NORMAL	COMMENTS
<b>NORTH AMERICA</b>			
Southeastern Alaska and West-Central Canada	108 to 947	181 to 2676	WET - 8 to 10 weeks
Vancouver Island, Canada	282 to 455	151 to 219	Heavy precipitation second half of January
Northwestern United States	2 to 21	5 to 30	DRY - 9 to 13 weeks
Pennsylvania and New Jersey	22 to 23	Around 27	DRY - 6 weeks
Canadian Maritime Provinces	48 to 90	42 to 58	DRY - 4 to 5 weeks
Mexico and Southeastern United States	60 to 304	186 to 5396	WET - 4 to 14 weeks
Central America and the Caribbean	28 to 57	11 to 26	DRY - 12 weeks
<b>SOUTH AMERICA AND EASTERN PACIFIC</b>			
Western Venezuela	0 to 13	0 to 23	DRY - 5 to 9 weeks
Northern Argentina and Adjacent Paraguay and Bolivia	144 to 348	191 to 327	Heavy precipitation first half of January
Eastern Paraguay and Southern Brazil	19 to 89	13 to 48	DRY - 5 to 7 weeks
Central Argentina	58 to 148	235 to 454	Heavy precipitation first half of January
Southern Chile and Southern Argentina	4 to 12	10 to 24	DRY - 5 to 6 weeks
<b>EUROPE AND THE MIDDLE EAST</b>			
Southern Greenland	100 to 254	212 to 258	WET - 2 to 4 weeks
Southwestern Iceland	132 to 179	176 to 191	Heavy precipitation second half of January
Norway	59 to 223	161 to 265	Heavy precipitation first half of January
Southern Scandinavia	6 to 14	10 to 35	DRY - 5 to 11 weeks
Central and Southern Europe and the Middle East	0 to 42	0 to 48	DRY - 5 to 14 weeks
Estonia and European Commonwealth of Independent States	38 to 69	179 to 199	WET - 4 to 5 weeks
<b>AFRICA</b>			
Morocco and Canary Islands	0 to 18	0 to 12	DRY - 10 weeks
Eastern Tanzania and Northeastern Mozambique	4 to 9	6 to 13	DRY - 5 weeks
Southern Africa	0 to 33	0 to 36	DRY - 5 to 22 weeks
<b>ASIA</b>			
Northern Iran and Turkmen	54 to 71	216 to 317	Heavy precipitation second half of January
Northern Pakistan and Adjacent India	67 to 93	238 to 333	WET - 2 to 5 weeks
Central Siberia	49 to 52	232 to 240	WET - 5 weeks
Northern Japan	6 to 52	12 to 46	DRY - 9 to 10 weeks
Ryukyu Islands	221 to 263	154 to 201	WET - 4 weeks
Southern China and Indonesia	59 to 166	218 to 711	Heavy precipitation first half of January
Southern Thailand	0 to 83	0 to 42	DRY - 4 weeks
<b>AUSTRALIA AND WESTERN PACIFIC</b>			
Eastern Indonesia and Southern Philippines	0 to 136	0 to 31	DRY - 8 to 14 weeks
Northern and Eastern Australia	0 to 85	0 to 36	DRY - 5 to 14 weeks

# 3-MONTH GLOBAL PRECIPITATION ANOMALIES

NOVEMBER 1991 - JANUARY 1992



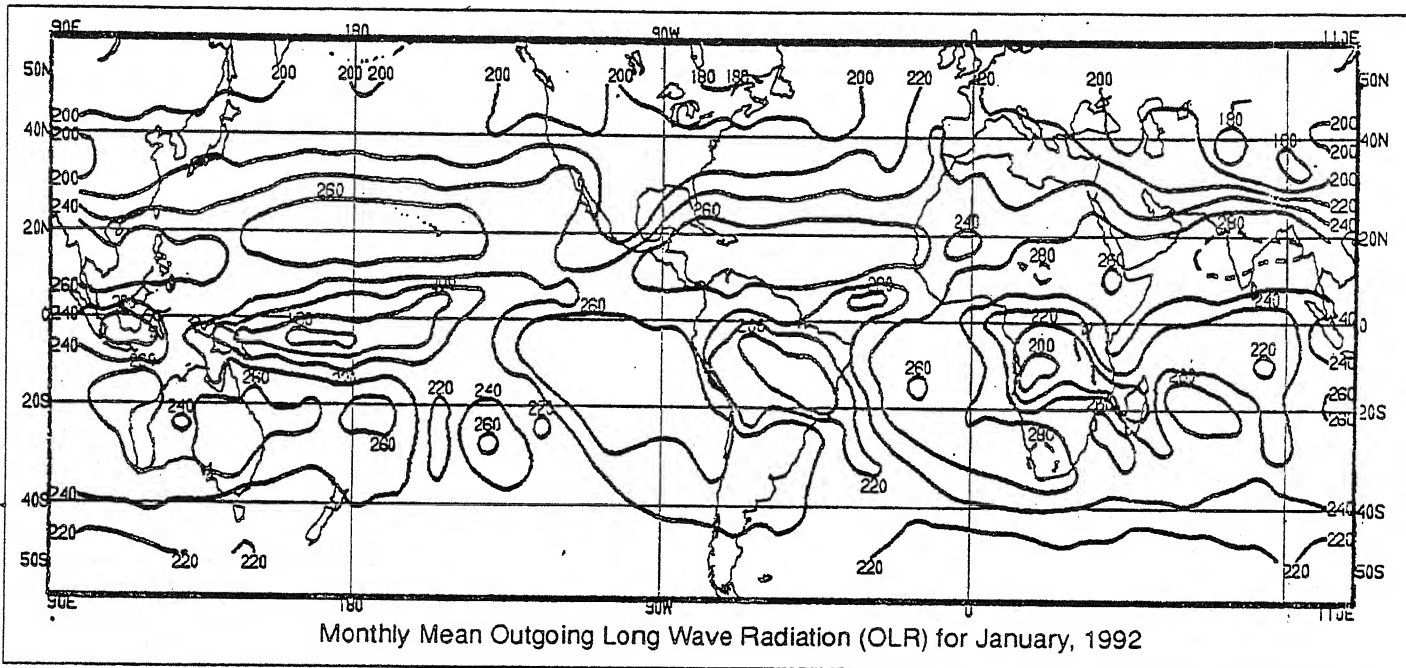
The anomalies on this chart are based on approximately 2500 observing stations for which at least 81 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the three month period is less than 50 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total three month precipitation exceeds 125 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of three month precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.





### EXPLANATION

The mean monthly outgoing long wave radiation (OLR) as measured by the NOAA-9 AVHRR IR window channel by NESDIS/SRL (top). Data are accumulated and averaged over  $2.5^\circ$  areas to a  $5^\circ$  Mercator grid for display. Contour intervals are  $20 \text{ Wm}^{-2}$ , and contours of  $280 \text{ Wm}^{-2}$  and above are dashed. In tropical areas (for our purposes  $20^\circ\text{N} - 20^\circ\text{S}$ ) that receive primarily convective rainfall, a mean OLR value of less than  $200 \text{ Wm}^{-2}$  is associated with significant monthly precipitation, whereas a value greater than  $260 \text{ Wm}^{-2}$  normally indicates little or no precipitation. Care must be used in interpreting this chart at higher latitudes, where much of the precipitation is non-convective, or in some tropical coastal or island locations, where precipitation is primarily orographically induced. The approximate relationship between mean OLR and precipitation amount does not necessarily hold in such locations.

The mean monthly outgoing long wave radiation anomalies (bottom) are computed as departures from the 1979 - 1988 base period mean. Contour intervals are  $15 \text{ Wm}^{-2}$ , while positive anomalies (greater than normal OLR, suggesting less than normal cloud cover and/or precipitation) are dashed and negative anomalies (less than normal OLR, suggesting greater than normal cloud cover and/or precipitation) are solid.

